doctors tend to provide it, although the kind of advice depends both on the doctor's religious beliefs and those of the patient.

A third general theme ... *is that the basic disagreement among doctors is on the means for achieving family planning, and this disagreement is based not on medical but primarily on religious grounds.*

This interesting report is primarily not a medical document. It is a sociological assessment of the extent to which non-Roman Catholic in contrast with Catholic, practitioners at a particular date in the late fifties were in fact helping or not helping their patients in contraceptive matters. Much in the report is saddening but encouragement may be taken from the evidence that the younger doctors are considerably the more liberal and helpful:

> to some extent they represent the influence of new trends in medical education that seek to broaden the scope of the physician's responsibility for the patient's general well-being.

G. C. L. B.

BIOCHEMISTRY

Garrod's "Inborn Errors of Metabolism." Reprinted with a Supplement by **H. Harris,** Oxford Monographs on Medical Genetics. London, 1963. Oxford University Press. Pp. xi + 207. Price 42s.

GARROD'S *Inborn Errors of Metabolism* has been an extraordinary book. In two periods of biochemical research has it been a rallying point and a far reaching inspiration. The concept that metabolism proceeds by a very large number of steps in each of which a compound is altered in one respect, and that each of these alterations is catalyzed by one specific enzyme, has been the main theme of biochemists in the 1930s and 1940s, when the metabolic cycles were elaborated. Under the influence of Garrod's pioneer work the one gene one enzyme concept related these cycles of metabolism to their inheritance. In the last years our precise knowledge of the structure of the abnormal haemoglobins and of their inheritance has further extended these ideas and, for example for the haemoglobins, genes have been related to the inheritance of the different polypeptide chains which must combine to form a haemoglobin molecule. *Inborn Errors of Metabolism* has long been out of print and the Oxford University Press has rightly chosen Garrod's work for its first Monograph on Medical Genetics. It is intended to publish a series, and four other monographs are being prepared: on the genetics of locomotor disorders by C. O. Carter and T. J. Fairbank; neurological disorders by R. T. C. Pratt; mental disorders by Eliot Slater and Valerie Cowie and of gastrointestinal disorders by R. B. McConnell.

The present monograph is more than a mere reprint. Professor H. Harris writes a brief biographical introduction and more than a third of the book consists of a contribution by him entitled "The Inborn Errors To-day"—a superb review of "the avenues along which the study of inherited disease and of human biochemical variation have advanced since Garrod". Thus the owner of the book will have the advantage of having at hand at the same time the beginning and the outcome of Garrod's work. There is also reprinted Garrod's famous article from the *Lancet* (1902) ii, 1616 (abridged) "The Incidence of Alkaptonuria: a Study in Chemical Individuality" (what a magnificent concept to coin in 1902!!), and a bibliography of Garrod's writings beginning at the age of twenty-one with the Johnson Memorial Prize essay of 1879 on "The Nebulae: a Fragment of Astronomical History" —and "A Visit to the Leper Hospital at Bergen (Norway)"—St. Bartholomew's Hospital Reports, 1884, and steadily continuing until 1936 when it ends with an article in the *Quarterly Journal of Medicine* on Congenital Porphyria.

This literary and scientific feast can be obtained for 42s.

H. LEHMANN

ZOOLOGY

Enders, Allen C. (Editor). *Delayed Implantation.* New York and London, 1963. University of Chicago Press for William Marsh Rice University. Pp. x + 318. Price 63s.

IN MOST MAMMALS of which we have sufficient knowledge, the developing egg implants promptly in the endometrium of the uterus soon after reaching the blastocyst stage. In a surprising diversity of species, however, the blastocyst can remain free within the uterus in a state of retarded or suspended development for variable

periods of time, after which normal development is resumed. This phenomenum is called "delayed implantation" or "embryonic diapause." In some species, such as the roe deer, black bear, badger, mink, stoat, marten, grey seal and armadillo, delayed implantation appears to be "obligate" and a normal feature of every pregnancy. In others, such as the rat, mouse, quokka and kangaroo, delayed implantation appears to be "facultative" and is known to occur naturally only as a concomitant of lactation.

This volume, though a most valuable contribution to the study of reproductive physiology, is hardly a book for the general reader. It comprises the proceedings of a three-day symposium held in January 1963 as part of Rice University's semi-centennial celebrations. It consists of nineteen papers, each with ensuing discussions, on the reproductive patterns of various species that exhibit delayed implantation and on attempts that have been made to elucidate the physiological mechanisms involved. It is well produced, with good illustrations and a useful index.

The narrative opens with a fascinating account of reproduction in the red kangaroo. In this species, the length of the first pregnancy is about thirty-three days. At birth, the single young enters the pouch where it remains and suckles for about 236 days. About two days after parturition, fertile oestrus occurs: the fertilized egg develops to a blastocyst but does not develop further until the previous young is preparing to leave, or is removed from, the pouch. Only when this occurs does the blastocyst resume its development and birth ensues about thirty-one days later. The normal gestation period may therefore vary from thirty-three to more than 234 days.

Considerable variation in gestation period is also a feature of a number of the other species considered. In the European badger, the normal "delay period" appears to be about ten months, but may be extended to over eighteen months under stress of captivity. In the mink, the gestation period can vary even between cubs of the same litter, for fertile matings regularly occur when "delay blastocysts" are already in the uterus.

Plausible explanations of the biological significance of delayed implantation can be offered in some instances. Field studies on the hill kangaroo strongly suggest that delayed implantation in this species contributes to reproductive efficiency and is likely to be of particular importance when pouch young are inadvertently lost. In some species, notably seals, that live in arctic climes where suitable conditions for parturition and mating are limited to a very short period of the year, delayed implantation with its accompanying extension of gestation may be important as a device for adjusting the reproductive cycle to the exacting conditions of the environment. A further suggestion made in respect of some of the mustelid carnivores is that mating at weaning time may serve as a means of keeping a male (probably not the father of the litter) at home when the young are most demanding of attention. Again, "lactation delay" in the rat and mouse may be seen as conferring the benefits of family planning while demanding no concern for the morrow. In many species, however, the adaptive significance of delayed implantation eludes us. Why, for example, should delayed implantation be necessary or desirable in the stoat (*Mustela erminea*) whereas it does not occur in the congeneric weasel (*M. nivalis*) living in the same areas?

The mechanisms, both environmental and physiological, by which delayed implantation is controlled, also remain largely unknown, but in this, as in all aspects of reproductive physiology, the available evidence illustrates a fascinating and perplexing diversity between species. It is clear from this book, however, that these problems are under active investigation, and that we may confidently expect in the near future a far better understanding of the problems of implantation, both delayed and otherwise.

MARCUS W. H. BISHOP

THE TWO CULTURES

Snow, C. P. *The Two Cultures: and A Second Look*, Cambridge, 1964. Cambridge University Press. Pp. iv + 107. Price 10s. 6d.

SIR CHARLES SNOW'S Rede Lecture for 1959, *The Two Cultures*, was reviewed in Notes of the Quarter in the October 1959 number of this